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NEW HISTORIES AND SPECIES IN HYDRÆCIA.

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(Continued from Vol. XXXIII., p. 68.)

In searching out the boring larvæ of the Noctuid genus *Hydræcia*, that large and showy species, *speciosissima*, has continued to prove a decided enigma. This great tawny fellow, with its distinctive white spots, must in the early stages leave some flagrant evidence of its whereabouts behind, yet try as we may all efforts seem in vain, and the conclusion was finally reached that Rye could not number this species in its local list. So the few records of its capture are looked up, and the determination is made to have a trial elsewhere. In 1868, Grote and Robinson described this species, together with *inquæsitæ*, under the generic term *Gortyna* (Trans. Am. Ent. Soc. I., 342), and relate receiving their types from Seekonk, Rhode Island. Knowing the tenacity with which a colony clings to a favourite resort, a couple of days in July, 1900, were taken for a flying trip to that place; the writer believing that should conditions yet remain favourable, the desiderata might still be found. Not being down on ordinary maps, it was inferred Seekonk might be some rural hamlet, perchance having the good fortune to remain unchanged all these years. But this ancient township, so strongly associated with Puritan days and Roger William episodes, has now merged into a suburb of the progressive city of Providence, and our hopes sank as we sped in electric cars through its byways. But hold! On passing some shady nooks, do we see aright? Yes, there is that brown, withered fern leaf—*inquæsitæ* is here sure enough. It cannot deceive us now, and soon there are plenty more in sight. At any rate, here is one of Mr. Grote's friends, but then *inquæsitæ* has a rather ubiquitous food-plant, and may be expected anywhere, while *speciosissima* is an unknown quantity entirely.

The following day the hunt is on in full vigour, but, search as we may, borers are scarce, in no way approaching the numbers of our home haunts.

Besides the fern borer, *marginidens* and a stray *cataphracta* are all that appear, and, disconsolate, it is feared our trip has been taken in vain. The flora is but slightly different from that of Rye, and those plants favourable for boring which are new to us are so few as to be easily examined, but all give negative results. One of the number is such a nice, smooth-skinned, stocky perennial, that it seems it should be infested by something, if only a common *nitela*. So it is hardly a surprise when in another locality, that has apparently run to waste for years, this plant is found containing young *Hydracia* at work in the stem. Not seeming familiar, though at such an early stage one cannot be very positive, a score or more are sought, and together with a supply of the food-plant are transported to the home menagerie. In due season a series of the imago is at hand, and, strangely, it proves a species that will fit in nowhere. So, though missing *speciosissima*, an unexpected result is scored in another direction, and the Rhode Island venture is voted a success after all. The succeeding year another lot of the larvæ are secured, that our earlier conclusions may be fully verified the second time, with a result to only strengthen the former impressions.

—Upon encountering new forms in a genus already well represented, and where these exhibit affinities closely connecting the representative species, the questions of varietal limitation at once become important. Perhaps the greatest help in such cases is a knowledge of larval developments, the wider the better, or the experience gained in viewing large series of the imagoes as they emerge into the perfect state. So it will happen in an extended study of *Hydracia* that certain delineations of specific characters become more or less easy and offer lines by which we may reasonably expect to differentiate them. More especially may this hold when recognizable differences occur in the early stages as well, so that it appears just how much one known valid species is separated from its ally. With the importance now properly given to larval structure, and especially that of tubercle arrangement as an aid in classification, the theories arising as to the development, use and significance of these characters are of more than passing interest. Furthermore, when considering them as a means of graduating genera to our conceptions of what may be "higher" or "lower" in point of specialization or descent, positive notes as to the acquisition of these characters carry importance. Thus, when meeting a *Hydracia* larva which nicely illustrated a point in this line, there was naturally a desire to draw attention to it. Yet, try as we may,

there seems no proper place to assign the species, and after careful consideration, aided from several sources in forming a more correct conception of the earlier described types in the British Museum, it appears incumbent to advance a new name. This is our apology for entering the domain of the describer, as our idea in this matter had been that such offices are only properly filled by the specialists in their respective branches.

Hydracia baptisiae, sp. nov.

Imago expands 35 to 38 mm.; the general characters and habitus fully typical to the *marginidens* section of the genus. Antennæ simple, both sexes, with a white scale at the base. The thoracic vestiture is ample, shaded with tints of primaries; the collar has a yellowish edging above, and is centrally prolonged into an adze-shaped tuft. The abdomen is also tufted with a series of small crests, which diminish posteriorly, and are lost on the fourth segment. The primaries show a trifle narrower in their proportions than some of the allies, with a tendency to acuteness at the apex. Colours are an admixture of red-brown overlaying a yellow ground, the outer portion affected but slightly by the usual purple shading. At extreme base a white scale; basal half-line irregular, "3" shaped, encloses an area well defined, and, in all cases noted, yellow. T. a. line indistinct except at inner margin, where it shows plainly geminate. It forms the outer boundary to a portion that is tinted with the purple shade of the outer spaces. T. p. line of the usual irregular course, bending outward past the reniform with a fairly true ogee curve; is geminate, having the inner line red-brown, the outer purplish. The median field thus enclosed is red-brown, the lower portion showing the yellow undercolouring more conspicuously. Median shade lines faintly discernible, a wavy shade from the lower part of reniform to inner margin. S. t. line very erratic, incurved between the veins; the subterminal area is an unbroken band from costa to inner margin, fairly parallel. Its colour is the same throughout, a reddish-purple. (Purple being the effect of mixing red and blue, the resultant tint may tend to one or the other of the primary colours in proportion to which predominates in the mixture. Hence, reddish-purple implies largely of red and little of blue. It is important to designate accurately the tone of the subterminal area, as it takes on a varying shade of purple in most of the species. With *purpurifascia* it shows very nearly a royal purple, while in *cataphracta* it becomes at times almost a simple blue.) The terminal space reverts to the tone of

the median field; a patch or shade near the apex is distinctly yellow. The ordinary spots are very white and contrasting, not unusually large, however; the reniform is broken centrally by the conventional lunulate line, and where the outer portions are divided by the veins the upper section is, in some instances, stained with yellow. The secondaries are pale yellowish, inclined to silkiness, the discal marking evident from above; veins and fringes a trifle darker, the latter beautifully silky when fresh. A wide, indistinct cloud along the outer margin. Beneath glistening, yellowish, clouded with rosy scales. The male genitalic characters show no departure from the usual type. Date of flight, Aug. 28 to Sept. 10. Types are in the British Museum, the National Museum at Washington (No. 6149), and in the collection of the author.

It is presumed the larvæ hibernate in their first stage. In the middle of June an entrance is made in the food-plant, *Baptisia tinctoria*, and the rest of its existence is passed concealed within its burrow. This plant, being indigenous, may well be considered the preferred or original one. The entrance is made well up in the stem, or sometimes in a branch, and the gallery continued downward. The lower stem and root are so very tough that progress here is slow, and the burrow rarely gets far below ground. Plants do not show the effect of this mining to any marked degree, so that in searching out the specimens one has to rely on those little tricks gained alone by experience, and amounting to a certain phase of woodcraft, if gratifying results are to be secured.

The pupa is sometimes formed in the burrow, though the more robust and active examples which mature earliest invariably leave the plant and change in the neighbouring soil. The young larva in the third stage from maturity bears out fully the conventional appearance of the group to which it belongs. The first four abdominal segments show as a dark purple-brown band or girdle, while the others are longitudinally striped with the usual whitish lines. A very faint trace of the dorsal extends over these four joints, which is a feature to be noted when making comparisons. In the succeeding stage the length becomes 28 mm., the proportions still very slender and cylindrical. Head normal, of a shining honey yellow in hue, and shows a dark line at the side which takes in the ocelli. Plates and tubercles are all strongly defined; special mention may be made of the anal leg-plates as being largest on this pair.

On the seventh abdominal segment tubercle IV., bearing a well-developed seta, is low down below the line of the spiracles, as is customary with Noctuid larvæ. On the preceding joints it is a little above the

spiracles, also a normal position. But at this point of larval existence a rather striking point of so-called specialization occurs, and this happens with a few other species also, which, though a trifling matter apparently, serves to differentiate it at once and forever from its near ally, *marginidens*. At the close of the stage a faint trace of a corneous plate appears on joint seven, in the exact position where IV. is on the preceding ones.

With the cast of skin that brings the larvæ into the penultimate stage, it is found there is a large, well-developed tubercle here on abdominal joint seven in the same position and of similar outline to IV. on the preceding joints. It has not been that IV. has been raised to its corresponding position on the others, for it is still occupying its previous normal position lower down, and we have to do clearly with an acquired character, which we may designate as IVa. The larva attains to a length of about 34 mm. in this stage.

Mature larva: The colour now becomes a soiled translucence, without traces of the usual lines. While the head and shield have increased, the plates situated at the true tubercles or elsewhere do not show a corresponding enlargement. The plate IVa is as large as the true IV., though both are of slightly less size than IV. on the preceding joints. This feature has been constant in a large series of examples, and is the principal feature of a structural nature by which it may be differentiated from its ally. There exists a very perceptible difference in size, colour and general appearance in their immature stages, obvious enough to one familiar with these borers, but it seems sufficient to separate our species in this matter of the acquired plate alone, as by it we can distinguish the larvæ of such dissimilar species as *inquesita* and *necopina*, *nitela* and *limpida*. Considering the development of this additional plate IVa as pointing to a higher specialization, and that those species possessing it represent a more recent evolution from the earlier type, permits us to look with some degree of assurance for this older form in such widely diffused species as *immanis* of our fauna, and *micacea* of Europe, whose common parentage seems unquestioned, and whose larvæ, at least the latter, have the normal Noctuid arrangement on the seventh abdominal segment. Continuing in this line, we might expect in the ornamentation of the imago the more rigid, straighter transverse posterior line as a primitive marking and a tendency with our later, specialized species as having the orbicular, claviform and reniform white-marked and contrasting—a feature not common to the Noctuids as a whole. Stress has been

laid on these features not only to point out their scope specifically, but to show that the later developed species, constituting the numerous clusters of the *rutila* and *marginidens* groups, have not yet had time to establish themselves very fixedly, nor to acquire striking individualities, and that the slight disparities now existing are in the main not surprising. It is not hard to find parallels elsewhere—*Datana* may offer an example—and doubtless the knowledge of larval development in many Noctuid genera will bring other instances to the surface. *Baptisia* larvæ reach maturity the first week in August, becoming from 40 to 44 mm. in length, and change at once to shining brown pupæ, which are typical with their allies and transparent enough that the white stigmal spots of the primaries can be discerned through the shell directly before emergence. According to the tabular arrangement of the imagoes in the recent Revision, it would find a position in section twenty-four next to *marginidens*, Gn. Had the larva remained unknown there might have been some hesitation in separating it from the latter, as variation, especially in size, produces some forms that come rather close to *baptisia*. Guenée's type is a good-sized example, truly typical (this is more than can be said of the type of *appassionata*, which is a slightly deformed specimen), showing the dentate fringes which frequently become noticeable in the larger examples. Our species differs in the colour of the basal spots, the size of the reniform and tint of ground colour, though the discrepancies are in no case great. In another direction *baptisia* simulates *circumlucens*, whose larva is unknown, but as a co-type rests in the writer's collection, and the other types have been examined, a position of certainty is assumed here. *Appassionata* is too unique in ornamentation to be confused, and *furcata*, as yet a very rare species, can in no way be confounded with the Providence species. To *rutila* there will be reference later.

Some examples of an undescribed *Hydræcia* from the Pacific coast have been referred to the writer for description in this article. It seems probable others may ultimately come to light from this source, since by the universal habit of keeping close we often miss meeting species in flight that become comparatively common when sought in their earlier stages.

Hydræcia insulidens, sp. nov.

The ornamentation is typical of the *rutila* series; ground colour, a light chrome yellow, presumably quite bright in newly-emerged specimens. The powdering of darker scales, common with others of the allied species, is not so marked in this case, though the veins, in being defined

by dull purple-brown scales, serve to tone down any striking colour effect.

Expanse 32 to 37 mm. ; head and palpi of usual proportions, front smooth, antennæ simple ; the thorax is clothed heavily, the usual tufts prominent in good specimens. At extreme base of primary a yellowish or whitish scale, variable as is so often the case in its degree of contrast ; basal line "3" shaped, and extends half way across, enclosing an area that may be whitish or more deeply stained with the tint of the ground colour. T. a. line not strongly marked, irregular in its course, best defined as it passes the claviform. The portion it bounds is decidedly purplish. The median field is strongly yellow, of a hue not copied by any eastern species here allied. Toward the costa purple shadings appear, developing into a noticeable shade or bar, which connects the orbicular and lower half of the reniform. The ordinary white spots are much stained with the yellow of ground colour, and are probably never a very pure white. They are of usual size and pattern, but not as a rule very contrasting. The median shade line shows more of a departure than any other marking. In lighter specimens it is best traceable ; beginning at the inner margin, it bends outward, then starts across the wing at nearly a right angle with costa. The point of difference lies in the angle, being lower than usual, and at the same time less acute. T. p. line geminate, well defined, bending outward opposite the reniform it produces a strong curve to the point of beginning on costal margin, which is directly above this spot. S. t. space entirely purplish, its line is irregular and inwardly dentate between the veins. The apical patch is yellow ; in lighter specimens the whole terminal space reverts to this colour.

The secondaries are more smoky in hue, with a faint deepening of colour at the outer margin ; veins traceable ; fringes incline to purplish. It is easy to imagine a vague, rosy flush existing in examples when just emerged, making them a rather pretty species. Under side is glistening, somewhat rosy, and shows the usual blending of darker scales.

The genitalic characters exhibit no strong individuality. Three examples, all from Vancouver Island, embracing both sexes, stand as types ; one in the Rutgers College collection, one with Mr. W. D. Kearfoot, a third with the writer. Other examples in indifferent condition have been seen, usually seeking shelter under the *rutila* label. The species seems a western representative of the white-spotted series that run so close in the east, but locally has no near relative. Its position in the

synoptic table would be in section twenty-three. While the larva is unknown, it is safe to presume that the pupa is not formed in the burrow. There can be no confusion with *Ochria sauzalita*, which appears farther southward in California, for though the latter has the ordinary spots white, it is of a different build, and possesses a structural difference whereby generic standing is attained.

Still another species allied to the foregoing may as well be here treated, since it will in no way lessen confusion in keeping the present status of this species as it now is. The rather wide scope of variation attributed to one of the Guenée species has proved too extended, with two forms at least receiving recognition under the term *rutila*. A suspicion of this was reached when better material came to hand, and the breeding of the larvæ side by side has dispelled any questions whatever. While the present reference may be lacking in fullness of the entire subject, the incongruity of considering too fully distinct species under one name, now that their position is realized, can no longer be excused. When Guenée described an American species under the name *rutila*, in 1852, so few others are known that he seeks the European *Ochria flavago* with which to compare. To one high in authority the following translation of his description is due, and since it might be unavailable to some who would care to give the matter attention, is here copied :

"Expanse 35 mil. Fore wings entire, of the same yellow as *flavago*, with the same bands and lines of the same colour. Reniform white, divided into several parts by the ground colour. Orbicular and clavi-form rounded, of a bright white, and between them a small white spot. Hind wings like *flavago*, but with washings effaced, abdomen whitish; base of antennæ white. Illinois, coll. Boisd. and Doubleday. It is perhaps the species which Duponchel says is so near *flavago*, in the supplement." The type, perhaps by this time not in the best of condition, rests in the British Museum. While there may be little to be gathered from this description on account of the number of American forms so closely related, yet its repeated comparisons with the European *flavago* are of assistance. That the local species we would differentiate from *rutila* has little to closely connect it with the exotic *flavago* is certain, and Guenée's type, as might be expected, is a much lighter insect. Occasion is now taken to expressly record the fact that our species, furthermore, is absolutely distinct from that figured by Mr. Moffat as *rutila*, CAN. ENT., Vol. XXXIII., pl. 2.* This latter occurs commonly to

*This plate was kindly furnished by Mr. Dwight Brainerd, of Montreal.—ED. C. E.

the Montreal collectors, who are also familiar with its larva. To them belongs the pleasure of a fuller treatment of the species, its life-history and habit. So it is the intention to proceed only with the species common to the Atlantic seaboard in this latitude, and of which notes on its early history were given by the writer, CAN. ENT., XXXII., 276.

Hydræcia duovata, sp. nov.

Expanse 34 to 38 mm. Antennæ simple, head smooth in front. Wings rather narrow; primaries acute; ground colour dull yellowish or tawny, powdered with dark rusty scales; when fresh a sheen as of dull brass is noticeable in those portions not affected by the dull purple shadings. The ornamentation and markings similar to the species previously described. Basal spots of the ground colour. T. A. line irregular, angulated or saw-toothed till it passes the claviform, when it is strongly outcurved. Inside this line a dull purple area, which is not highly contrasting. T. p. line geminate with the customary outward curve over the cell. Median field is dull yellow, and evinces most notably the darker powderings. The shade line is confused until making the angle, from which point it pursues a straight, oblique course to the inner margin. S. t. space evenly defined in dull purple, and the terminal space, except for the yellow apical dash, is scarcely of a lighter shade. The fringes are the same shade of purple. The ordinary spots are white, the reniform rather small, and stained with yellow in its upper outward portion. The orbicular has usually a dark scale at the centre, and is disconnected by the merest thread from the claviform, which is made up of two oval parts.

Secondaries are dark for this section of the genus. It is the tone here and of the body vestiture which appeals strongly in separating the species. In any species the depth of powderings on the primaries often produces a phase of variation, but the tone of the under wings and abdomen do not alter. One appreciates this with the extended series to be had by breeding, and its force becomes influencing. The male genitalia are typical. Imagoes fly in September, never appearing until *nitela* has been in evidence for some time. Types are in National Museum and collection of writer. This occasion is taken to request correspondents to change all *rutila* labels sent out from Rye to *duovata*, as this species alone has been dispensed under the Guenée label.

To Mr. Wm. Schaus we are indebted for a comparison of the species with the type of *rutila* in the British Museum. A good series in this,

as well as a number of allied species, were sent to him, so that a full appreciation of their exact relationship could be obtained, and his conclusions under the circumstances may be considered authoritative. In the unsolicited opinion that *duovata* differed from the type, the departures are skillfully noted, and his comparisons and verifications of the other species whose types were before him in the Museum collection, leave no room to say the matter was treated without weight or with carelessness. Should subsequent developments cause adverse opinions to arise, however, we would beg for the retention of our name in a varietal sense as designating this narrow-winged form peculiar to the salt-water Golden-rod, and whose early history had only been wrought out after years of diligent searching. Its larva is so easily recognizable—indeed this and *cataphracta* form a section by themselves on larval characters—that it seems improper to have its individuality subject to any confusion. On being confronted by the evidence which may be procured throughout the various stages by breeding these insects, it is believed any who may feel alarm at this increase of our list, or fear the subject has fallen into the hands of an extremist, will find relief upon making individual studies in the genus. The plate accompanying this article is an innovation perhaps, in that it may be the first time Noctuids have been depicted by this process. While there is much yet to be desired in controlling the colour scheme, and the purple iridescence of the subterminal space has been lost entirely, the individuality of each specimen is beyond cavil, and we do not need to make an allowance for high colouring, since the pictures in no way flatter the insects.

H. baptisiae, Bird, shows in the two figures the ordinary sexual disparity. *H. limpida*, Gn., has not been previously figured, and is sufficiently typical. *H. cerussata*, Grt., also typical, is compared with its close ally that the differences may be noted. *H. cataphracta*, Grt., was introduced for comparative value. *H. impecuniosa*, Grt., is at times confused with the former when in imperfect condition, and is shown for the first time. The specimen is larger than ordinary. *H. duovata*, Bird, gives a fair idea of the species, and, as variation is not great, should be a means for easy determinations. *H. necopina*, Grt., had not been figured before, and at this time may be of interest. *H. inquisita*, G. & R., is rather an undersized specimen, but is typical in that the spots are concolorous. The angulated shade line, a distinctive feature, may be noted in the likeness, which is the first to have been caught of this species. *H.*

insulidens, Bird, the only example not bred, shows the insect in a good light, and should be an aid to western collectors.

A few remarks further argumentative to the results of these studies may be pertinent. The extent to which variation proceeds with this genus has long been a subject receiving attention. That affecting the imago is such as to cause little uneasiness, even though extended in a very few cases. When it is a question of size or wing outline we can explain this in a partly mechanical sense. When their larvæ have lived in an especially rank or vigorous plant an excessive subsequent development may be expected, while those larvæ that leave their burrows from one cause or another and suffer from a lack of food until locating in some substitute, produce the undersized or dwarfed specimens so frequently met with. Thus the rank growth of *Ambrosia trifida*, on the Jersey meadows, yields a giant race of *nitela*, whereas the dwarfs so often seen among *marginidens* and *cerussata* are the result of the larvæ leaving their original abode and taking up with some substitute like Burdock. The wing outline is influenced by the quarters occupied by the pupa; when this is formed in a gallery having insufficient room for a normal development, the resultant imago has the primaries narrower and more acute at the apex in proportion to this previous condition. *Impecuniosa* and *duovata* best illustrate this feature. The colours of the imago here as elsewhere are subject to their peculiar vagaries, but it is not found that they are in any way exceptional. Just what produces colour is not definitely known, of course, but it pertains no doubt to a chemical rather than any mechanical process. So the slight disparities at times noted in the same species, as arising from differences in the food-plant, might be explained on this ground, though it does not meet the question properly. Further than citing that colour is most susceptible to change in the depth of powderings, in the hue or even suppression of the ordinary white spots, it may be needless to proceed. We may apply the general biological law to the effect that commoner and more widely distributed species are apt to show a greater variation, and not meet with any incongruities. The common *nitela* best shows the departures ever taken in the colour scheme, but they are positively not due to locality, food-plant, sex, or even the varying conditions that might assail different broods, and the form to which the varietal name applies is merely the extreme in the opposite direction. But varietal studies have not been confined to the imago

alone, the larva also having received close scrutiny. Two cases of variation, alone worthy the name, are all that have been noted. One a colour change due to a certain food-plant; the other, extreme, with a corresponding departure in the moth that makes it easy to fancy, points out the way new species are formed. This departure occurs with *purpurifascia*, and is primarily the result of food-plant and the accompanying conditions. So many captures of this species had come to light from sections where Columbine did not grow, it was evident there must occasionally be some other food-plant. So it was not surprising when the discovery was made, even in this locality, that in Loosestrife, *Lysimachia quadrifolia*, another popular food prevailed. Indeed, in all places thus far examined by far the greater number will be found at work in the latter plant. Yet, strangely, one would hardly associate the robust Columbine feeders with the attenuated examples in Loosestrife, for these at maturity are scarcely half the diameter of the former, though in length they rather exceed them. Their peculiar proportions are due to the very small size of the Loosestrife stems and roots, and the Harris term "spindle worms" as applied to these borers seems now most fitting. The tubercles do not attain the size, or the colours the depth, of the Columbine feeders, yet there is no difference in the position of the former. The resultant moth exhibits a constant disparity, the purple fascia, which is really the outer portion of the t. p. line, is narrowed and much less striking; the general tone is subdued, and with a marked difference of wing outline, produces a form that is at all times unmistakable. Still, it may be wise to differentiate them by no other terms than that of their respective food-plants. Doubtless many of the varietal names of our lists would never have been created had the reason for such occurrences been better understood, or the significance of the departures fully noted.

It may be fitting to conclude with a quotation from an authority who is summarizing on an extended research in the whole biological field: "False facts are highly injurious to the progress of science, for they often endure long; but false views, if supported by some evidence, do little harm, for everyone takes a salutary delight in proving their falseness, and when this is done one path toward error is closed, and the road to truth is often at the same time opened." Let us hope in the present case what are advanced as facts may prove such beyond peradventure; while from the views, thanks to the authority, but slight trouble can ensue in any event.

ECOLOGICAL LABELS.

I have been greatly interested in reading the suggestive article by Mr. Lutz, in your last (April) number, on labels. It voices a need, which every student of ecology will have felt, for more information than accompanies the specimens in the usual collection. No one can collect insects carefully without making observations that are new to science, and it is unfortunate that such observations are generally left unrecorded. Mr. Lutz proposes a plan that would make the observations of the amateur collector available for comparison, and that would wonderfully enhance the value of his cabinet. It is, in short, proposed that the collection shall be its own expositor, that pin labels on the specimens shall tell at a glance what usually, if recorded at all, has to be hunted through the leaves of an accompanying catalogue. Nature's label is, of course, already on every specimen, but we are not yet skillful enough at reading the imprint of environment as written in bodily form and structure, and need to be told in our own language.

But instead of using our common language, Mr. Lutz proposes a system of signs and symbols—blue, green and red lines on labels to indicate hydro-, meso- and xerozoic animals respectively, and bits of coloured paper of various shapes to indicate a few special habitats—and therein, I fear, lies the weakness of his plan. It is arbitrary. His collection without his key would possess no notes at all. I have used coloured papers, but have never happened to hit upon the same meaning for them that he suggests, and I have long since forgotten what some colours once stood for. I frequently see wholly enigmatical bits of coloured paper on the pins of specimens in the collections of other people. Under existing circumstances it would be difficult to bring about that uniformity so absolutely essential even in the use of the few signs suggested.

But a far more serious defect of the plan is that it does not go far enough. The few types of habitat provided for are entirely insufficient for ecological purposes. The collector of aquatic insects would have to begin at once inventing additional signs to indicate anything further than that his insects came out of the water, and the collector of gall insects would find in the system no provision for the important facts he would wish to record. No system of arbitrary signs could conveniently meet the needs of all entomologists, even if it could be trusted not to lead to dire confusion.

Still, I have faith in the general idea Mr. Lutz sets forth. I believe the pins or vials can be made to carry far more ecological information than notebooks usually do carry, and that the usefulness of collections would be greatly enhanced thereby. I have been experimenting with the loading of the pins, and I have come to the conclusion that the English tongue is our safest means of communicating observations, and that printed labels are both feasible and economical. Printers' ink is black and permanent, in air or in alcohol.*

What sort of printed labels are now commonly used? There is but one that has become at all universal, and that is the locality and date label. A collector's name label is not uncommon, nor is a sex sign label. Then there is the red label with "type" printed across the end, well established in some of the more important collections, and I would suggest, if entomologists may act in concert, the restriction of this colour to typical material in the broader sense; the above-mentioned label for types of species, and a red label with the author's name for all material that has served as the basis of his papers. Some Lepidopterists are using "at light" and "at sugar" labels, and I have found almost indispensable "bred" and "taken in transformation" labels. These are all separately useful, and if one be getting printed labels at all, he can get them all, and more, almost as easily as he can get one of them alone, for labels are printed a dozen or more at an impression, and a dozen different forms can be set up as readily as a dozen of one form. Neither does one find his pins becoming encumbered by labels, for rarely are more than two necessary.

What sort of ecological labels may advantageously be added to the foregoing? Probably a different sort in every ecological group. But if they be printed in plain English, it will matter little how many different sorts or whether collectors in the same group use the same sort. So, I will offer a suggestion relative to recording ecological data for aquatic insects, a label that will tell fairly the sort of aquatic home from which the insect comes, consisting of twelve words descriptive of features of habitat, printed in four columns of three words each in pearl type:

bottom	level	mud	reedy
side	sloping	sand	trashy
surface	steep	rock	bare

*I am keeping an ever-increasing proportion of my collection in alcohol. It is the bane of American Neuropterology that systematists have kept, or have tried to keep, their specimens all on pins. There is one thing much worse than a specimen without a label, and that is a label without a specimen, especially if the specimen were a type.

The nature of the habitat is to be indicated by the underscoring of the proper words. By combination of underscores a very satisfactory statement of aquatic conditions can be made.

However, if the locality label were a general one, as "Lake Forest, Ill.," I would suggest also a more general aquatic habitat label to go on the pin, above the one just illustrated, to be marked by underscoring in the same way:

lake marsh river rapids
pond bog creek eddy
pool swale brook spring

In a locality for which a standard detailed map is available, the great exactness in locality records that is required in local ecological work may be attained by indexing the map in the usual way—with letters on one side and numbers on the other, and then adding to the usual general locality label the letter and number from the map, to indicate the exact spot from which the specimen was obtained. But, after all, from the ecological standpoint, the fixing of the exact locality is of much less importance than the exact indication of the sort of habitat in which the specimen is found.

JAMES G. NEEDHAM, Lake Forest, Ill.

MORE CONCERNING LABELS.

It was with interest that I read the article by Mr. Frank E. Lutz in the April number of the CANADIAN ENTOMOLOGIST entitled "Labels."

It is not so very many years ago (perhaps thirty) that we were satisfied if specimens sent to us only bore a State label, the State label as first used being nothing more or less than a coloured disk, a different colour for each State. A few years more, and we had the abbreviated State labels — N. J. for New Jersey, Can. for Canada, etc. Not long after, we asked our friends to mark the label in such a manner that we might know from what part of the State the insect came. Then it was that the collector with pen and ink would mark the label in one of the corners, or perhaps make a mark in the centre, thus designating as to what part of the State the insect had come from. This was not a bad plan, and to-day many such labeled specimens can be seen in the "Horn Collection," as well as other collections in New York and Philadelphia. However, we were not yet satisfied, so some fifteen years ago our Washington friends started to have local labels printed with a blank space in which to write the date of capture. A few years more and the collector's name was called for, and this, by many, was also added. Now we have the "Lutz Label" presented to us as a further advancement in the

labeling of our specimens. The question is, however, if it is necessary or of much practical use to label specimens in this manner, as students of entomology who have had any experience in collecting generally know whether a certain species of insect or group of insects is found in a wet or a dry place. He knows but little who would look for Cicindelidæ or the larvæ of any of our Rhopalocera in a mill-pond, or for Dytiscidæ or the larvæ of any of our Odonata in a dry pine woods. However, no one will find fault with the specimens from Mr. Lutz bearing the "Lutz Label," providing the specimens are in good condition and are accompanied with exact locality and date of capture, and if collector's name is given it will do no harm. All collectors of natural-history specimens have a reputation, some better than others — the Ornithologist and the Oologist found this out long ago. There are, no doubt, many insects that it would be wise to mark in the manner Mr. Lutz speaks of, but to label all our captures in this way would be a waste of precious time.

PHILIP LAURENT,

Philadelphia, Penn.

FENARIA SEVORSA AND EUSEMIA SABULOSA.

BY HARRISON G. DYAR, WASHINGTON, D. C.

I was in error in referring these species as synonyms in 1894. The latter now stands as *Tuerta sabulosa*, Boisd., in Hampson's Cat. Lep. Phal., and is credited to New Mexico and California, besides other more southern localities. Very possibly the species may occur within the limits of the United States, but I have no specimens from our territory, all being from Mexico. *Fenaria seversa*, Grote, is, however, not the same insect, and the name must be restored from the synonymy. It has been subsequently described and well figured in the Biologia Centrali-Americana as *Diamuna aedessa*, Druce. This position, in the Noctuidæ, is undoubtedly correct, as the antennæ are shortly pectinated, without any trace of enlargement. The genus *Diamuna* is an Agaristid, and Druce's species is therefore improperly referred to it. The genus *Fenaria*, Grote, must be substituted for *Diamuna*, Druce (nec Walker). Dr. Barnes has taken the species in the Huachuca Mts., and Mr. Hubbard in the Chiricahua Mts., Arizona. Dr. Barnes has also from Arizona *Diamuna longipes*, Druce, so that the genus is thus represented in our fauna:

Genus *Fenaria*, Grote.

seversa, Grote. Ariz., Mex.

aedessa, Druce.

longipes, Druce.

Ariz., Mex.

NOTES AND DESCRIPTIONS OF PERLIDÆ.

BY NATHAN BANKS, EAST END, VA.

In going through the accessions to my collection, I have found several new species and new localities for some known forms. Most of these are included in this paper.

Perla capitata, Pictet.

P. capitata, Pict.: Hist. Nat. des Neuropt., p. 214, 1841.

P. tristis, Hagen: Syn. Neur., N. Amer., p. 22, 1861.

On comparing specimens of *P. tristis* with Pictet's figure and description, I find that these species are identical, a fact which I had suspected before.

Perla fumosa, n. sp.

Head orange yellow, a large black spot covering the lateral ocelli and extending forward to the clypeus, a brown spot above each eye; basal joint of antennæ dark brown, rest pale yellowish brown; pronotum wholly dark brown; thorax yellow above, with brown spots on mesothorax; abdomen pale yellowish brown; venter yellowish, as is also the under side of the thorax; legs dark brown, but little paler beneath; setæ yellow on base, brown beyond; wings slightly fumose, veins brown. Pronotum very much narrower behind than in front, its sides straight, angles quite sharp. In the male there is a median brown spot on the last ventral segment.

Length, ♂, 16 mm.; ♀, 22 mm.

One pair taken together near Washington, D. C., 11th June, 1899. Readily separated from *P. capitata* by the yellow under side of thorax, etc.

Perlinella sobria, Hagen.

Perla sobria, Hag.: Bull. Geol. Surv. Terr., 1875, p. 577.

One specimen sent by Prof. Cockerell, collected at Las Vegas, New Mexico, June, 1901. It agrees very nicely with Hagen's description, and can be easily recognized by the three pale spots in a row between the eyes.

Perlinella frontalis, n. sp.

Head with a large pale yellowish spot each side above the eye and reaching to the posterior margin, almost touching each other on the median line, which is black; the posterior angles brown; a large blackish spot in the middle of the head, pointed behind, in the middle covering the lateral ocelli, and tapering forward to the clypeus, a yellow spot

each side above base of antenna, and connected to the yellow behind. Pronotum blackish, a small pale spot in middle of each side margin; rest of thorax dark brown; abdomen brown; venter pale brownish, with an elongate black spot on the side of each segment. Legs and setæ pale yellowish brown. Wings hyaline, veins mostly dark brown, some apical ones and some of the transversals yellowish brown. Radial sector two-forked beyond the anastomosis. Pronotum but slightly rugulose, its sides much rounded, as are also the posterior angles.

Length 13 mm.

One specimen, Beulah, New Mexico, May 30 (W. Porter).

Perlinella signata, n. sp.

Head pale yellowish; a blackish spot covering ocelli and extending forward, leaving a yellow mark over base of each antenna; within the dark mark are two median pale yellow spots, one between the ocelli, and another rather smaller in front of the median ocellus; antennæ brown; under side of head yellow. Pronotum brown, the side margin and a broad stripe in the middle yellowish; the ridges marked with black; rest of thorax brown, with a median yellow spot on front margin. Abdomen brown; venter and pectus pale yellow, a brown spot each side in front of second and third coxæ; legs and setæ pale yellow, the knees and tarsi more brown. Pronotum almost twice as broad as long, its sides nearly parallel and straight, angles almost acute. Wings hyaline, rather yellowish, veins brown, those of hind paler; radial sector twice-forked beyond the anastomosis. Ventral lamina entire, its apical margin evenly rounded.

Length 14 mm.

One female from Michigan, without further locality.

Chloroperla 5-punctata, n. sp.

Head pale yellow, the ocelli and lateral callosities black, the latter resembling ocelli; antennæ yellowish, upper side of basal joint brown. Pronotum pale yellow, with a large quadrangular brown spot on each side, leaving a rather broad median pale stripe; rest of thorax and the abdomen pale yellowish, as are also the legs and setæ; wings hyaline, veins pale yellowish brown, the costal ones on basal half pale yellow. Wings rather long and slender, the radial sector twice-forked beyond the anastomosis; pronotum rectangular, angles rather sharp, sides straight and parallel, about one and three-fourths times as broad as long.

Length 10 mm.

One specimen from Las Vegas, N. Mexico, by the Gallinas River,

June 9 (Cockerell); another specimen from Colorado, probably near Fort Collins.

Nemoura venosa, Banks.

I have taken this specimen at Washington, D. C.; the types came from Colden, N. Y.

Nemoura Coloradensis, Banks.

I have recently seen a specimen taken by Prof. Cockerell from top of range between Sapello and Pecos rivers; New Mexico, 11,000 ft., on August 2.

Nemoura pallida, n. sp.

Head, pronotum, thorax and legs pale reddish yellow; ocelli and lateral callosities black; tarsi brownish; basal joint of antennæ yellowish, with brown above, rest of antennæ brownish. Abdomen brown; wings yellowish hyaline, veins yellow-brown. Pronotum about one and two-thirds times as broad as long, as broad behind as in front, its sides slightly convex. Wings long and slender; the cross-vein at end of discal cell, though very oblique, does not reach back to the fork of the median vein; a striking character.

Length 10 mm.

One specimen from Little Beaver, Colorado; July 8.

DESCRIPTION OF A NEW CARNEADES.

BY JOHN. B. SMITH, SC. D.

Carneades fusimacula, n. sp.

Resembles *redimicula* in most points, but with the colours of *divergens*. The collar has the broad median black shade of *redimicula*; but the primaries do not have the pale costa. Sub-costal and median veins gray. Ordinary spots outlined in gray, the orbicular oblong, oblique, open inferiorly and fused with the reniform, the outline being continuous. The spots are gray powdered and are preceded by black shadings in the cell. A blackish basal streak, to which is joined a long claviform extending half way across the median space: this is black-margined but concolorous. S. t. line not marked, apex grayish, terminal space else nearly concolorous. In other characters much like *divergens*, with which, also, it agrees in size.

Habitat.—California.

The type is a unique male in the collection of the U. S. National Museum, exact locality not known.

The original description for this species was written prior to 1891, but in some way it seems to have escaped publication. My attention was drawn to the matter in 1893, when the species was cited in the catalogue without a reference, but for some reason the omission was not then made good. To entitle the name to recognition in the forthcoming catalogue, it is hereby formally authenticated by description.

The species should be easily recognizable by its intermediate position between *redimicula* and *versipellis*, and by the fused ordinary spots.

NOTES ON LYCÆNA SCUDDERII, EDW.*

BY HENRY H. LYMAN, M. A., MONTREAL.

Writing of this species in his magnificent work on the Butterflies of New England, Dr. Scudder said :

"This butterfly is double brooded throughout the whole of its range, the first generation making its advent during the last week in May, the females emerging the first week in June, when the males are common. * * * The second brood varies considerably in the time of its apparition. Mr. Saunders reports that the first butterflies appeared one year in London, August 2nd ; while Mr. Lintner took the first at Albany on July 15th, another year found them beginning to fly by the 7th, and one year even found them 'very abundant' on the 9th. * * * The eggs are doubtless generally laid in both July and August, but whether the mature larva or the chrysalis hibernates is unknown. * * The caterpillar has been taken in the field only by Mr. Saunders, who found it upon *Lupinus perennis*, Linn. * * The European species, to which it is closely allied, are reported to feed upon *Melilotus*, *Genista*, *Hedysarum*, *Trifolium*, *Onobrychis* and *Colutea*. Our species feeds with the utmost freedom on *Lupinus*, * * but it must find other food in the high north. Edwards states that it also feeds on *Ceanothus*. * * * The history of this butterfly needs to be closely followed after August to determine in what condition the insect passes the winter. If in the egg state, * * where is the egg then laid ?"

The first time I had the pleasure of meeting with this butterfly in life, and only a field naturalist knows the pleasure of first seeing in life a species familiar in the dried state, was on 10th July, 1898, during a day's collecting at High Park, on the western outskirts of Toronto, where I

*Read before the Montreal Branch, 11th Feb., 1902.

found it abundant, and coquetting with the harebells. About 5 o'clock they were settling for the night on the fructifying stems of grass.

On 19th July, 1899, I again visited the same locality, and secured a pair in coitu, which I boxed and took home to Montreal, and on the 23rd put the female in a cage with *Melilotus Alba*, Desv., *Vicia Cracca*, L., and *Phryma Leptostachya*, L., as *Lupinus* was not available. Before placing her in the cage, she was fed with sweetened water, as she had had nothing since her capture on the 19th, and she fed for three hours. She was fed again twice, but on 30th was found to be dead, and the cage was dismantled and a careful search made for eggs resulted in finding three on the *Phryma*, one laid on the upper side of a leaf near the edge, one just at the junction of a leaf-stalk with the main stalk, and the third on the same leaf-stalk about $\frac{1}{4}$ inch from the other.

Scudder described the eggs as being pale green, the tracery of raised network being frost-white upon it, but in my notes they are described as white like porcelain.

The winter was passed in the egg state, the box containing them being kept in a cool cellar. On 28th April I observed that one of the larvæ had chipped the egg, and was trying to get out, but it did not seem able to enlarge the hole sufficiently. About a week later it was still alive, and was seen moving, but did not succeed in getting out. One larva hatched all right, but the third egg showed no sign of life. I did not, however, succeed in getting the one larva to feed.

On 15th May I paid another visit to High Park to look for larvæ, and succeeded in finding about ten, some of which I sent to Dr. Fletcher. They were in different stages, some nearly mature. Some were found on the Lupines, and a few in curled-up dead leaves of trees lying under the plants. The ants were running about the plants, which I knew indicated the probable presence of these larvæ, though at first I found them difficult to find.

These wild larvæ had evidently hatched a good deal earlier than mine, but that is easily understood, as the locality where they were found is a bank sloping towards the south, the soil being very sandy, and receiving the full effect of the sun's rays, I was simply baked lying on the ground to search for the larvæ, so that any snow that fell would melt early in the spring, and vegetation would start early, while our season in Montreal would be probably a week or ten days later.

In my experience, the larvæ eat holes in the leaf, sometimes away from the edge, and sometimes at the edge, though I occasionally noticed a leaf where the parenchyma had been eaten out and the membrane left, as described by Scudder.

As I had found one or two larvæ within curled-up dead leaves, I thought they might seek such a retreat for pupation, and so kept one in the breeding jar, and three out of the four that I carried to imago pupated inside the leaf provided, and the fourth on the lid of the jar. The first one pupated on 20th May, the second on 21st, the third not noted, and the fourth on 26th. On 1st June the first two were dark coloured, and both emerged on 2nd June, the first in the morning and the second in the afternoon. The third emerged on 4th or 5th, and the fourth either in the evening of the 5th or morning of the 6th. The pupal period varied, therefore, between 11 and 13 days.

Now, in regard to food-plant, I am positive that even if the second brood ever feeds on *Ceanothus* (which I think most unlikely), the first brood cannot, for the simple reason that it does not leaf out early enough. There are several clusters of *Ceanothus Americanus*, L., the New Jersey Tea, the flowers of which, by the way, are very attractive to *Thecla*s, growing within a couple of hundred yards of where I found the larvæ of *Scudderii* on Lupine, but on 15th May, when these larvæ were nearly mature, the buds of the *Ceanothus* showed no signs of even swelling, so if this butterfly exists north of the region of Lupine, we must look for some other food-plant than *Ceanothus*.

Postscript.—I wrote to Dr. Scudder about the question of food-plant, but he was unable to give me any information, and then wrote to Mr. Edwards, and received a reply as follows :

"Coalburgh, W. Va., 17th Feby., 1902.

"Dear Sir,—

"I have no recollection as to the *Ceanothus*. * * * I think S. has made a mistake in referring to me.

"Yours truly,

"W. H. Edwards."

Since reading my paper, I have received a copy of the note on "Scudder's Blue" by Mr. J. B. Williams, reprinted from "The Ottawa Naturalist" of January, in which he records finding, on 7th Dec. last, two eggs on the withered leaf-stalk and seed-pod of Lupine.

THE FORMATION OF GENERIC NAMES.

An article in the April number of the CANADIAN ENTOMOLOGIST leads me to offer a few remarks on this subject. The custom of forming new generic names by attaching a prefix or suffix to the existing name of a related genus has grown to serious proportions in recent years. There are several reasons why it should be discountenanced. For one thing, it almost invariably makes the name too long to look or sound well. This is no trifling disadvantage, although some entomologists seem not to appreciate the fact.

A second objection is that these names are usually lacking in euphony, as a result of the grafting process, having a tendency to break in two at the point of junction when they are spoken.

A third is that the relation indicated by the name may not really exist when the group comes to be more fully studied, or when different characters are made the basis of classification; or, an entomologist may simply make a mistake in assuming a relationship, which cannot be corrected after the generic name is once published. For instance, Eugnoriste is as far removed in relationship from Gnoriste as it could be and remain in the same family.

Still another objection lies in the danger that the name used as a foundation may turn out in the course of time, by the application of we know not what rules of nomenclature, to be invalid, or to apply to some other group, thus leaving the later name either meaningless or misleading. In Mr. Ashmead's article, which called forth my observations, this is a glaring objection to his procedure, as he states in the article that the genus *Pompilus* is preoccupied. Hence, his new names will in future suggest a relationship to the Mollusca or Pisces, rather than the Hymenoptera!

Such combinations as I object to would be all but impossible in the present generation, as they have been in the past, had we but the same æsthetic perception of euphony, and the same classical training, as the fathers of entomology. I might add to this, had we the same sense of responsibility when we establish a new genus.

I am aware that occasional instances on the best authority can be found that are open to one or another of my objections. I am also aware that I once made a genus that I called *Gnamptopsilopus*, which is open to all my objections but the third; but I have reformed since then.

J. M. ALDRICH, Moscow, Idaho.

BOOK NOTICE.

JACOBSON, G. G., AND BIANCHI, V. L. Orthoptera and Pseudoneuroptera of the Russian Empire and adjacent countries. After Dr. K. Tümpel's "Die Geradflügler Mittel-Europas," Part I, pp. 1-80, tab. I.-V. St. Petersburg, 1902. Ed. by A. Devrient, 4to. (in Russian). Price, complete work, about \$7.

The authors of this work have for their object to collect all possible information concerning the fauna of the superorders of Orthoptera and Pseudoneuroptera in the above-named geographical limits, and to give the keys for identification of all species inhabiting this extensive area, comprising almost all Europe (except south-west) and the north of Asia to the Himalayas and Central China.

The first part of the work, just published, contains introduction, keys to the nine orders, an almost exhaustive bibliography of the subject (over 921 Nos. concerning the Orthoptera genuina alone), and an account of the order Dermaptera—"earwigs." The latter is accompanied also with a bibliographical list (166 Nos.) and the keys to the genera and all the species inhabiting the above-mentioned countries. The account of the geographical distribution over the vast Asiatic portion of Russia is of great interest, being quite new and elucidating some important facts in this respect. The synonymy, very surprising in certain cases, is based on the strong laws of priority.

Taking into consideration the great faunic affinity of both the North American and Eurasian continents, we must acknowledge this work, when continued and completed with the same skill and accuracy, will be very useful to every investigator of these insects in North America. The Russian language will not offer any great inconvenience to the serious student of these orders.

NICHOLAS KUSNEZOW,
St. Petersburg.

Mailed May 6th, 1902.

